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ABSTRACT

The physical fitness status of Chinese college students was evaluated, and selected physical fitness characteristics were compared between American and Chinese college students. Male college freshmen (112 Americans, mostly Caucasian, from a university in the Midwest and 261 Chinese from a college in southern China) were the subjects. All subjects were measured with a battery of tests including body weight and height, grip strength, trunk flexion (sit and reach), vertical jump, agility run, and skinfold measurements. American students scored significantly higher in body weight, body height, all of the four skinfold measures, and grip strength. They also ran faster in the agility run test. The Chinese students jumped higher in the vertical jump test. The Chinese students were significantly thinner than their American counterparts. Although absolute grip strength and leg power were significantly higher for American students, the relative grip strength and relative leg power were higher for the Chinese. There were no significant differences in trunk flexion between groups. Results may reflect differences in nutritional status, eating habits, and lifestyles. Includes 11 references. (JDD)

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COMPARISON OF SELECTED PHYSICAL PARAMETERS BETWEEN AMERICAN AND CHINESE MALE COLLEGE STUDENTS

by

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It is evident that hypokinetic degenerative diseases, such as osteoporosis, muscle atrophy, loss of flexibility, cardiovascular degeneration, and respiratory problems are related to lack of physical activity (Kraus and Raab 1961; Smith 1982; Brewer et al. 1983; Paffenbarger et al. 1984). On the other hand, regular exercise can enhance the quality of life since people who are physically active are able to do more things without assistance and with less physical and emotional strain. Health benefits of regular exercise include a stronger heart and more open blood vessels, regulated metabolic functions such as control of blood sugar, better controlled mild or moderate anxiety or depression, and stronger bone and muscle (Simon 1985).

Each individual has different requirements for regular physical activity, depending on hereditary endowment for withstanding disease, occupational physical demands, proclivities for recreational and sport activities, and the probabilities of unforeseen events placing unexpected physical demands upon the body (Van Huss et al. 1969). However, it is very obvious that there are very few physical challenges in this overly mechanized and industrialized civilization, in particular with the development of robots and computers. In addition, the spontaneous physical activity and regular sports involvement is inversely related to age (Ostrow 1984). The task of physical education, therefore, is to reverse the trend toward physical inactivity and the resulting physical degeneration in our society. Athleticism when young alone can not protect against coronary heart disease. The British National Fitness Survey has shown that the executive grade civil servants who were athletic in college but then gave up exercise derived no advantage in incidence of coronary heart disease in later life, unless they were currently engaged in vigorous sport (Morris et al. 1987).

College students can be considered as a special group in society because of their status of physical and mental development, their intellectual pursuits, and their unique living environment. Experiences have shown that, with proper approach from physical educators, college students can easily acquire an understanding and appreciation of the benefits of physical activity. Consequently, more people from this group maintain regular exercise throughout the rest of their lives (Montoye et al. 1957).

Review of literature indicated that information on physical fitness of Chinese college students in the Peoples' Republic of China is lacking. Consequently, comparison of physical fitness characteristics between American and Chinese college students previously has not been made. Such a comparison could foster intercultural understanding and contribute to the literature in this area. Therefore, the purpose of this study was an attempt to understand the physical fitness status of Chinese college students and to compare some selected physical fitness characteristics between American and Chinese college students.

Male college freshmen, 112 American (mostly Caucasians) from a university in the Midwest and 261 Chinese from a college in southern China, were the subjects in this study. The ages of both groups were comparable (19-20.5 years old). All subjects were measured with a battery of tests including body weight and height, grip strength, trunk flexion (sit and reach), vertical jump, agility run, and skinfold measurements. For each of the Chinese students, front and side pictures (2 X 2 color slides) were also taken for somatotyping purpose. Equipment for body weight and height measures were calibrated before they were used. For other tests, the same equipment, such as skinfold caliper, stop-watch, sit and reach box, and hand dynamometer, were used for all subjects in both groups. Standard methods and procedures for physical fitness testing recommended by the American Alliance for Health, Physical Education, Recreation and Dance were followed for all the measurements. Assistants for testing were trained and tested before data collection started.

Using 2x2 color slides, somatotyping of the Chinese students were performed by two specialists according to Sheldon's method (1954). The results of their ratings indicated that there were 0% endomorphy, 15.6% mesomorphic ectomorphy, and 84.4% ectomorphy among the 261 Chinese subjects. Somatotyping was not conducted on the American students because some of them objected for personal reasons.

The results of data analyses for the measured and created parameters of this study are presented in Table 1. For the measured parameters, the American students scored significantly higher in body weight, body height, all of the 4 skinfold measures, and grip strength ($P < .01$). They also ran faster in the agility run test ($P < .01$). On the other hand, the Chinese students jumped higher in the vertical jump test ($P < .01$). For the created parameters, the Ponderal index, an ectomorphy index (Heath and Carter 1967), showed that the Chinese students were significantly thinner than their American counterparts ($P < .01$). It is of interest that although absolute grip strength and leg power (Lewis Nomogram, Fox et al. 1988) were significantly higher for the American student, the relative grip strength and relative leg power were higher for the Chinese ($P < .01$). There were no significant differences in trunk flexion between groups ($P > .01$).

The results of this study clearly showed that there are significant differences in physical and performance characteristics between typical American and Chinese male college students. The American group consisted of mostly Caucasians. In comparison to the Chinese, these American students were bigger in size (body weight and height), had more body fat (skinfold measures and Ponderal index), were stronger in both upper and lower body strength (absolute grip strength and leg power), and were quicker in mobility (faster agility run time). However, the higher body fat content and lower Ponderal index numbers suggested that these American students had less relative lean

body mass than the Chinese students. The significantly better vertical jumping score among the Chinese students further supports this suggestion since better vertical jumping ability requires a higher muscular strength to body weight ratio. The results of this study may also reflect the differences in nutritional status, eating habits, and life-styles.

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Table 1: Comparison of Selected Physical Parameters Between American and Chinese Male College Students

	Body Wt. (kg)	Body Ht. (cm)	Skinfold (mm) Biceps	Triceps	Sub-scapular	Supra-iliac	Grip Strength (kg)	Relative Grip Strength	Vertical Jump (cm)	Trunk Flexion (cm)	Agility Run (sec)	Ponderal Index	Leg Power (kg.m/sec)	Relative Leg Power
American n=112	78.8 ±12.3	179.3 ±7.8	4.7 ±2.4	11.0 ±5.1	11.6 ±5.8	23.2 ±11.3	51.7 ±8.7	0.661 ±0.095	53.4 ±9.1	11.6 ±7.1	16.3 ±1.0	42.0 ±1.3	1265.1 ±218.2	16.1 ±1.4
	*	*	*	*	*	*	*	*	*		*	*	*	*
Chinese n=261	54.3 ±5.0	167.2 ±5.5	3.0 ±0.7	6.2 ±1.6	9.5 ±1.9	10.8 ±3.4	38.6 ±5.9	0.714 ±0.108	58.1 ±7.1	10.6 ±6.1	18.2 ±1.0	44.3 ±1.2	915.7 ±113.1	16.9 ±1.0

All values are means ±SD. * Significant difference ($P<0.01$) between the means of American and Chinese students (t-test)
Relative grip strength = Grip strength/Body Wt.
Ponderal Index = $Ht/\sqrt[3]{Wt.}$
Leg power = $\sqrt{4.9}$ x Wt. x $\sqrt{\text{vertical jump}}$
Relative Leg Power = Leg Power/Wt.